PTO 08-0358

CC=JA
DATE=19901217
KIND=Kokai
PN=02303343

LINEAR MOTION MOTOR

[RINIA MOSHON MOTA]

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UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. October 2007
TRANSLATED BY Schreiber Translations, Inc.

PUBLICATION COUNTRY	(10):	JA
DOCUMENT NUMBER	(11):	02303343
DOCUMENT KIND	(12):	Kokai
PUBLICATION DATE	(43):	19901217
APPLICATION NUMBER	(21):	1123451
APPLICATION DATE	(22):	19890517
INTERNATIONAL CLASSIFICATION	(51):	H 02 K 7/06
PRIORITY COUNTRY	(33):	N/A
PRIORITY NUMBER	(31):	N/A
PRIORITY DATE	(32):	N/A
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DESIGNATED CONTRACTING STATES	(81):	N/A
TITLE	(54):	LINEAR MOTION MOTOR
FOREIGN TITLE	[54A]:	RINIA MOSHON MOTA
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Specifications /1

(54) [Title of the invention]

Linear motion motor

Claims

1) A linear motion motor characterized by inserting a nonrotating screw shaft in the central hole of a rotor, and displacing the rotor in the axial direction of the screw shaft by engaging this shaft with a nut provided in the inner wall of the said central hole.
2) A linear motion motor wherein the small diameter section of the rotor is freely mounted in the hole provided in the stator cover, its larger diameter central hole inside wall is formed as a nut, and the said nut is engaged with the nonrotating screw shaft inside this central hole.
3) A linear motion motor as specified in Claim 2 wherein the lengths of the said rotor small diameter section and large diameter section are flexibly set corresponding to the moving distance of the rotor.

3. Detailed description of invention

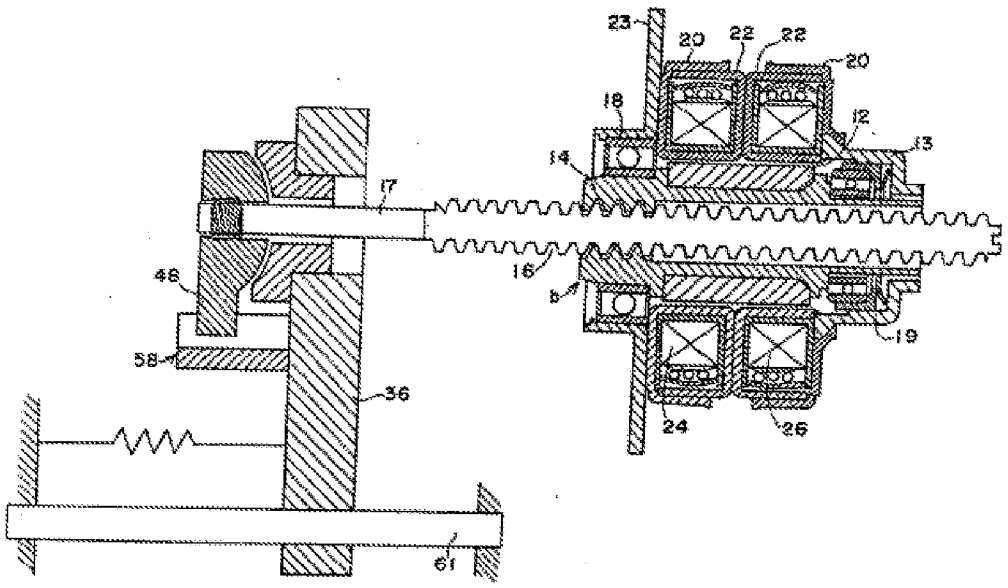
[Field of invention] The present invention relates to a motor in which a rotating body can be displaced in the thrust direction of the shaft by utilizing the rotation of the rotor.

[Prior Art]

Conventional motors of this type, as shown in Fig. 2, are provided with bearings 18 and 19 in a fixing plate 23 and cover 13 fixed to a stator formed from yokes 20 and 22. Rotor b is constituted from a magnet 12 and nut 14, and can freely rotate supported by the bearings 18 and 19. The screw 16 of the screw shaft 17 is engaged with

nut 14

Fig. 2 第 2 図 /3



of rotor b. Further, a whirlstop 48 is provided at one end of the screw shaft 17, and the whirlstop 48 is supported in an immobile manner by a guide 58, slider 36 and a guide rod 61. Further, linear motion motors are known wherein on passing current to the coils 24 and 26 provided in yoke 22, yokes 20 and 22 are excited, and due to mutual interaction with magnet 12, rotate the nut 14, and though the rotational force acts on the shaft 17, and since such rotation direction motion is controlled by the whirlstop 48, guide 58, slider 36 and guide rod 61, the screw shaft 17 is moved in an axial direction due to the engaging action of screw 16 and nut 14.

(Problems the invention aims to solve)

In the said conventional linear motion motor, there was the drawback in that it was necessary to provide the whirlstop mechanism on the outside of motor for stopping the motion of screw shaft, and such a configuration was not only complex but linear motion of the shaft also could not be obtained with only motor.

Thereupon, in the present invention, the aim of

resolving the said drawback is achieved by offering a simple linear motion motor provided with a mechanism on the motor stator itself for preventing the rotation of the screw shaft.

(Means to solve the problem)

The means to solve the problem is explained below.

A linear motion motor is provided wherein it is a linear motion motor characterized by mounting a nonrotating screw shaft in the central hole of a rotor, and by engaging this shaft with the nut provided in the inner wall of said central hole, displacing the rotor in the screw shaft axial direction, and in which the small diameter section of the rotor is freely mounted in the hole provided in the stator cover, its larger diameter central hole inside wall is formed as a nut, and the said nut is engaged with the nonrotating screw shaft inside this central hole.

(Effect)

According to the present invention, by the rotation of the rotor, the hut provided in the central inside wall of the rotor engages with the screw shaft. Since the screw shaft is unable to rotate as it is fixed to the fixing plate attached to the stator, only the rotor is displaced in the axial direction by said engagement.

(Example)

One embodiment of the present invention is explained below with reference to the appended diagram.

In Fig. 1, coil 6 is housed in stator 5, a cover of ⌐¬ cross-section shape 7 and fixing plate 8 at front and rear of stator 5 are provided. A freely rotating rotor 2 of the motor is provided in the space between the yoke 5 and the fixing plates 7 and 8.

A nut 3 with which the screw shaft 1 described later engages freely is provided on the inside wall of the

central hole 10 of the wide diameter section W of the

第 1 図

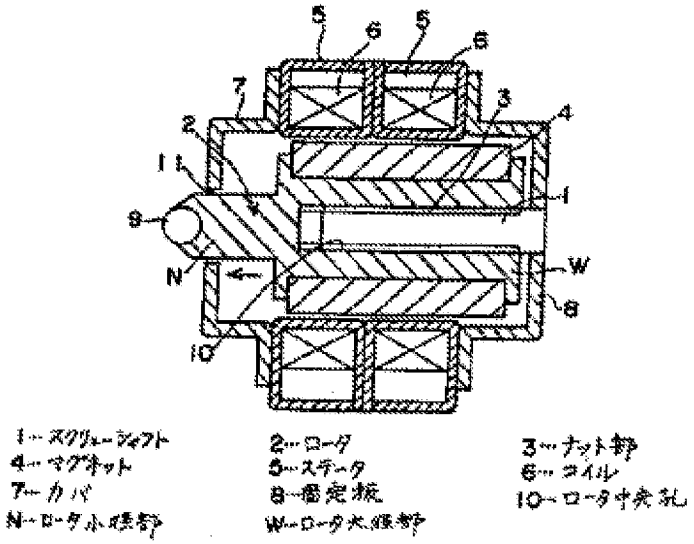


Fig. 1

1…Screw shaft 2…Rotor 3…Nut

4…Magnet 5…Stator 6…Coil

7…Cover 8…Fixing plate 10…Rotor central hole

N…Rotor small diameter section

W…Rotor large diameter section

rotor 2. The end of the said screw shaft 1 is mounted in an immovable state at the center of a fixing plate 8 provided on one side of the stator 5. A magnet 4 is provided in the outer periphery of the rotor 2, and a narrow section N having a hole 9 at its end is inserted through the hole 11 provided in cover 7 provided in the stator 5. The said narrow section N and wide diameter section W are inserted taking into consideration the movement distance of the rotor 2 in the thrust direction, and the required lengths are preset.

Regarding the operation of this motor, stator 5 is excited on energizing the coil 6, and the rotor 2 rotates together with magnet 4 because of mutual interaction with the magnet 4. Although nut 3 provided in the inner wall

of its central hole 10 engages with the screw shaft 1 due to the rotation of the rotor 2, since the edge of the screw shaft 1 is fixed to the fixing plate 8 in an immovable manner as already explained, the rotor 2 moves linearly in the direction of the arrow as shown in Fig. 1 while being supported by the screw shaft 1. Further, if the rotation direction of the rotor 2 is reversed, it moves in the linear direction opposite to the direction of the arrow.

Of course, the linear displacement distance of the rotor 2 is flexibly decided by the wide diameter section W and length of the narrow section N.

(Effect of the invention)

Based on the detailed description above, according to the present invention, since the structure is made by providing a fixed screw shaft and engaging the said screw shaft with a nut in the inner wall of a freely rotating rotor, linear motion can be obtained by motor alone. /3

4. Brief description of diagrams

Fig. 1 is a cross-sectional diagram depicting one embodiment of the present invention.

Fig. 2 is a cross-sectional diagram depicting a conventional embodiment.

1…Screw shaft, 2…Rotor, 3…Nut, 4…Magnet 5…Stator, 6…Coil, 7…Cover, 8…Fixing plate, 10…Rotor central hole, N…Rotor small diameter section, W…Rotor large diameter section